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GB 1443170

(58) Field of search
B7H
Selected US specifications from IPC sub-class B60K

(54) Plastic fuel tank for vehicles

(57) A vehicle fuel tank (1) made of plastic material comprises at least two injection moulded half shells (3, 4) secured together in sealed manner along a connecting portion (5). Preferably a plastic outer strip 6 is moulded onto the connecting portion 5 for securing the half shells together in sealed manner. A seal may be inserted between the connecting portions. The tank is preferably made of nylon.

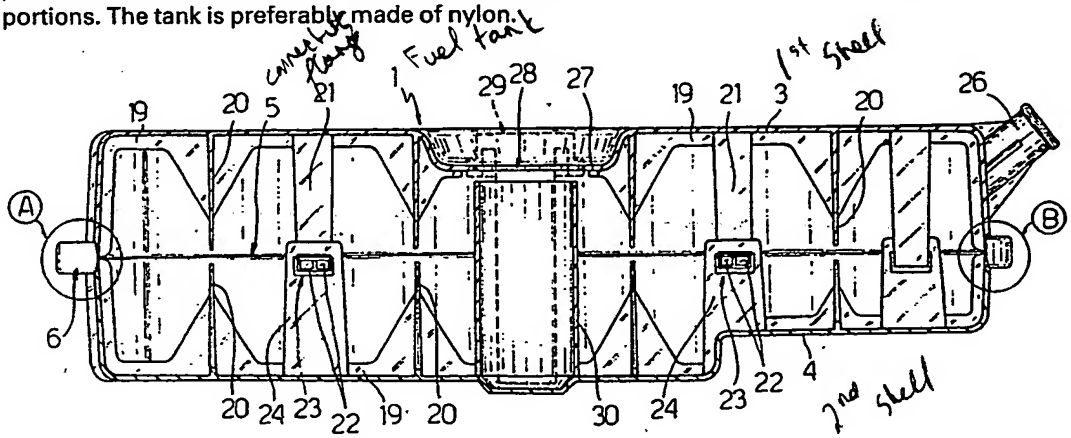

Fig.2

Reservoir integral formed

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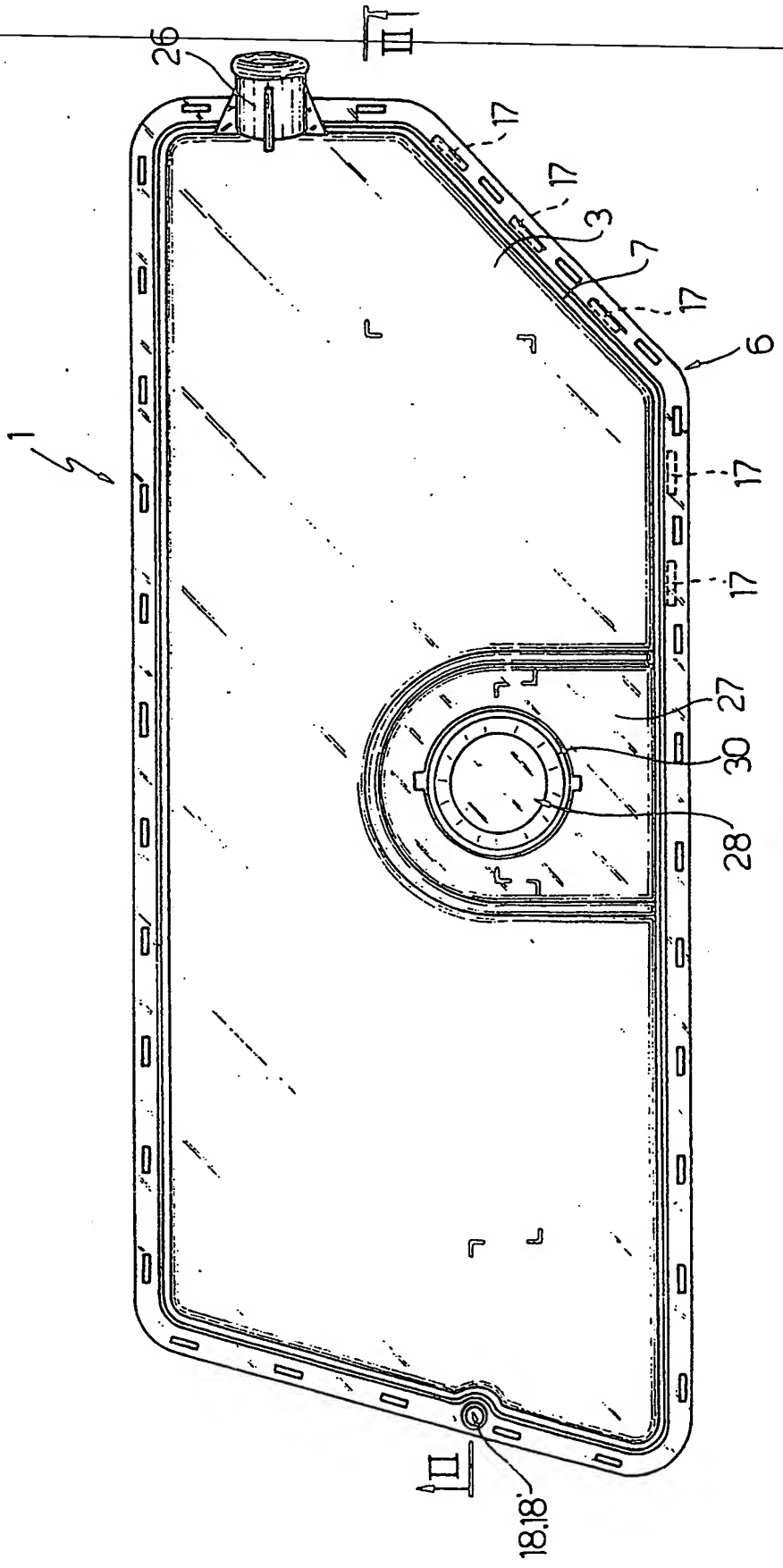

Fig.1

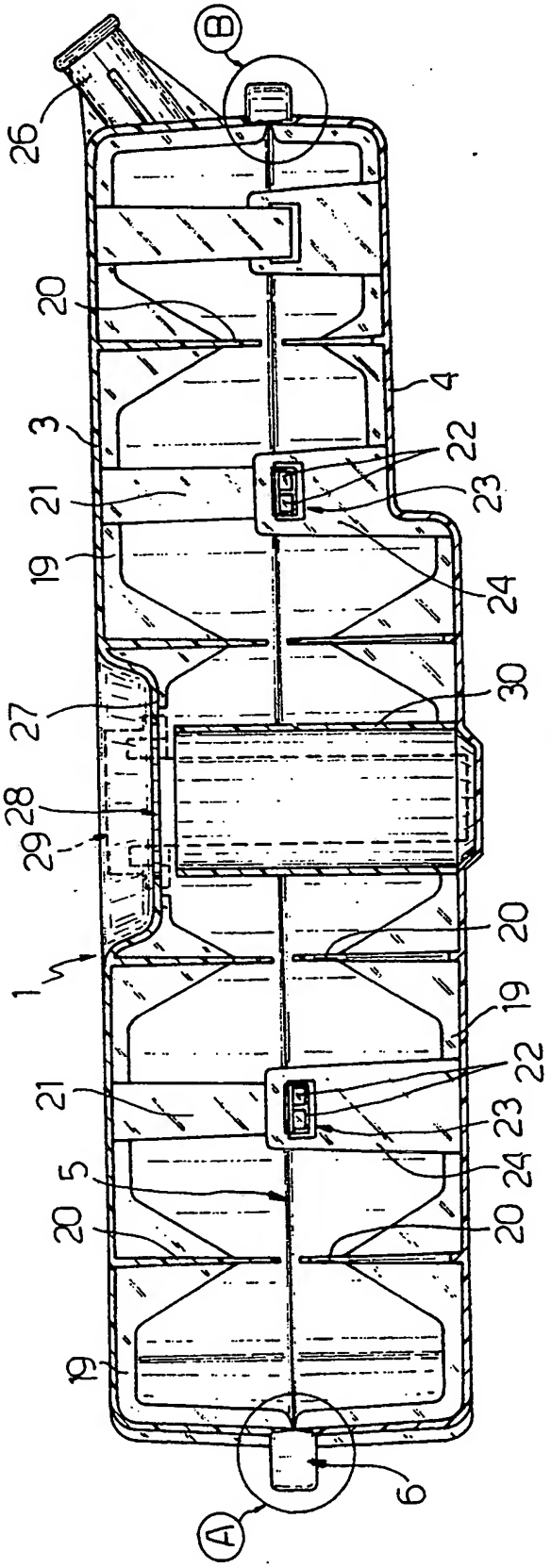

Fig.2

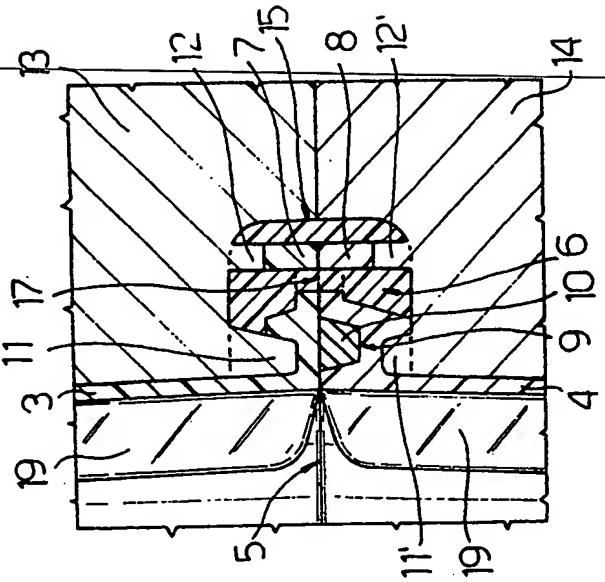

Fig.4

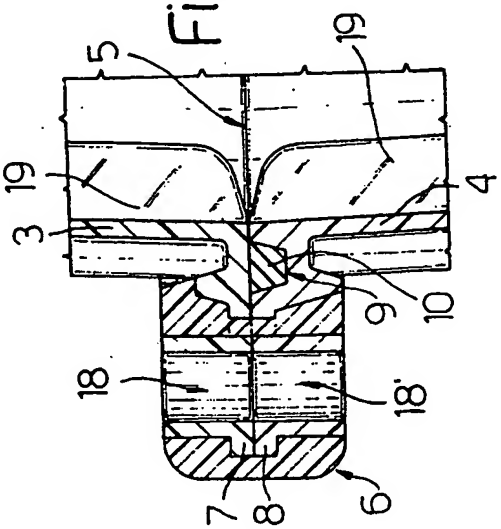

Fig.3

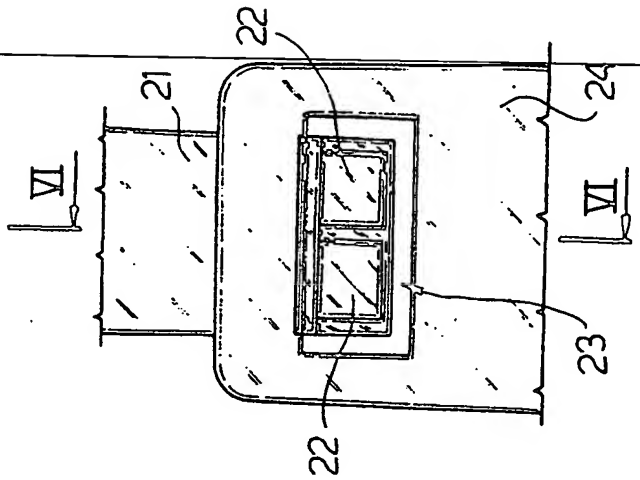

Fig. 5

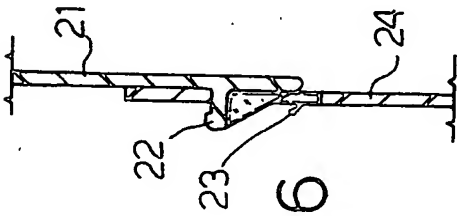

Fig. 6

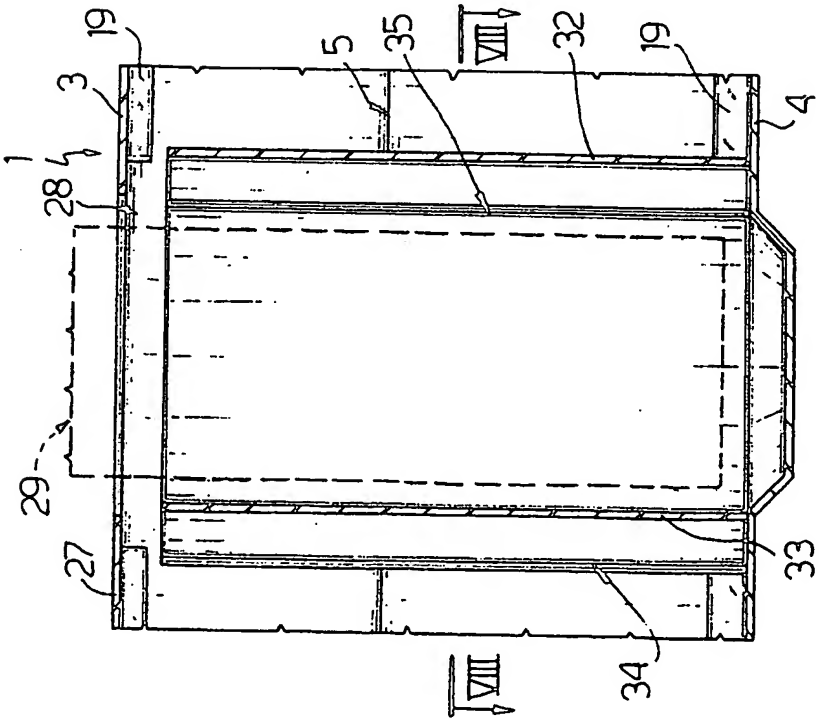

Fig. 7

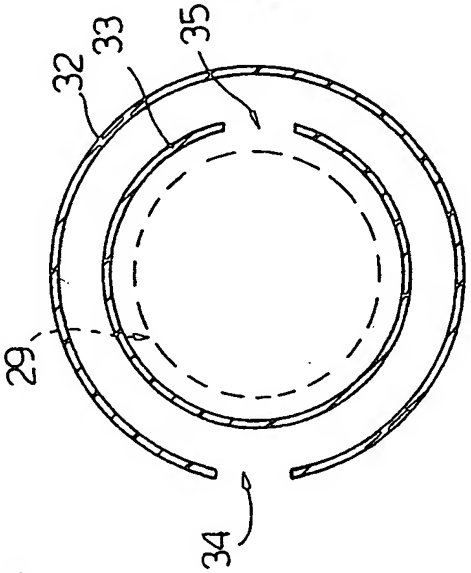

Fig. 8

SPECIFICATION

Plastic fuel tank for v hicles

The present invention relates to a plastic fuel tank for vehicles, in particular, automobiles.

In recent times, increased use has been made of plastic fuel tanks, on account of the advantages afforded as compared with traditional metal types. In addition to providing for greater scope in terms of shaping, thus enabling greater tank capacity within a given available space, plastic fuel tanks are also more resistant to rust, mainly caused by water in the bottom of the tank, and, more importantly, to impact, by virtue of their ability to buckle without breaking.

Mass produced plastic tanks as of present are made from blown plastic, the disadvantage of which is that it greatly reduces the range of materials available for mass production. One material used is high-density polyethylene, the disadvantage of which, however, is that, being of a porous nature, it tends to sweat and must therefore be subsequently sulphonated on the inside surface. Furthermore, the manufacturing cycle for producing tanks from blown plastic is fairly time-consuming, does not enable the formation of tight bend radii, thus resulting in the finished tank being fairly bulky in size, involves considerable scrap equal to the weight of the finished tank, and, finally, involves subsequent welding for connecting the external piping.

The aim of the present invention is to provide a plastic fuel tank for vehicles, designed to overcome the aforementioned drawbacks.

Further aims and advantages of the present invention will be dealt with in the following description.

With this aim in view, according to the present invention, there is provided a plastic fuel tank for vehicles, characterised by the fact that it comprises at least two injection molded half shells secured together in sealed manner along a connecting portion.

One embodiment of the present invention will be described by way of example with reference to the accompanying drawings in which:

Figure 1 shows a top view of a fuel tank according to the present invention;

Figure 2 shows a section along line II-II of the Figure 1 tank;

Figure 3 shows an enlarged section of portion A on the Figure 2 tank;

Figure 4 shows an enlarged section of portion B on the Figure 2 tank during production;

Figure 5 shows a partial view of an inner portion on the Figure 2 tank;

Figure 6 shows a section along line VI-VI of the Figure 5 portion;

Figure 7 shows a section of a portion of a different embodiment of the tank according to the present invention;

Figure 8 shows a section along line VIII-VIII of the Figure 7 portion.

according to the present invention and comprising two half shells 3 and 4 respectively defining the top and bottom halves of tank 1 and injection molded from a suitable non-porous material resistant to hydrocarbons, conveniently nylon 6 or nylon 12 or other plastic materials. The said two half shells 3 and 4 are secured together in sealed manner along a peripheral connecting portion 5 by means of a plastic outer strip 6, conveniently made of nylon 6 and co-molded onto the adjacent bottom and top outer edges 7 and 8 (shown more clearly in Figures 3 and 4) of half shells 3 and 4 respectively. In more detail, half shells 3 and 4 are first injection molded inside respective molds, after which, a peripheral cavity 9 on outer edge 8 of half shell 4 is fitted with a seal 10 consisting, for example, of a rubber seal or cross-linking plastic material (e.g. polyurethane foam). The said two half shells 3 and 4 are then arranged with outer edges 7 and 8 contacting, and held in position (Figure 4) by means of a continuous peripheral appendix 11 and spaced appendixes 12 on a mold punch 13 acting on edge 7, and similarly, by a continuous peripheral appendix 11' and spaced appendixes 12' on a mold punch 14 acting on outer edge 8. Th said mold punches 13 and 14 combine to define a mold cavity 15 surrounding the outside, top and bottom of edges 7 and 8 on half shells 3 and 4, and inside which the said outer strip 6 is injection molded. In the said edges 7 and 8, there are also formed respective peripherally spaced cavities, s as to form a respective through opening 17 inside which is molded an inner portion of strip 6 which acts as a strengthener between the top and b ttom portions of edges 7 and 8. As shown in Figure 3, in edges 7 and 8, there are also formed coaxial openings 18 and 18' forming a passage for elements (not shown) securing tank 1 to an appropriat support on the vehicle. As shown in Figure 2, half shells 3 and 4 present integrally molded inner strengthening ribs 19 and walls 20 acting as antislosh separators for the fuel inside the tank. The said half shells 3 and 4 also present integrally molded inner portions 21 extending downwards from the upper wall of half shell 3 and terminating at the bottom in hook portions 22 (shown more clearly in Figures 5 and 6) designed to click into respective slots 23 formed at the top of portions 24 extending integrally upwards from the lower wall of half shell 4.

In half shell 3, there is also formed an integral external pipe portion 26 to which is connected an external fuel supply pipe (not shown). In a conveniently lowered centre portion 27 of the upper wall on half shell 3, an opening 28 is formed for rec iving, conveniently by means of a bayonet connection, a known type of unit 29 indicated by th dotted line in Figure 2 and comprising a fuel level detector, a fuel intake pipe and a return pipe. Inside tank 1, the said unit 29 is surrounded by a semi-circular wall 30 extending integrally upwards from half shell 4 and the function of which is to provide an inner, steady-fuel-level compartment. As shown in Figures 7 and 8, in an alternative em-

placed by a pair of concentric circular walls 32 and 33 having diametrically opposed openings 34 and 35 forming a labyrinth on the inner compartment for steadying even further the fuel level inside the tank. Such a labyrinth solution is particularly useful if the said unit 29 comprises an electric fuel intake pump.

The advantages of the tank according to the present invention, mainly deriving from the said tank being formed in two injection molded halves secured together in sealed manner along the connecting portion, will be clear from the foregoing description. In particular, the said half shells 3 and 4 may be formed from various materials. In the event nylon is used, this has the advantage of being non-porous, as well as resistant to hydrocarbons, thus enabling subsequent sulphonating to be dispensed with. The said half shells 3 and 4 may also be made of different materials. For example, bottom shell 4 may be made of self-extinguishing material, possibly with built-in wire netting or other strengthening elements. Injection molding half shells 3 and 4 also provides for a relatively fast production cycle, and for producing half shells 3 and 4 in any appropriate shape. In particular, top shell 3 may be molded to match the bottom of the car, thus providing for a snug fit inside the tank compartment, and achieving maximum tank capacity. Furthermore, by virtue of injection molding half shells 3 and 4, shell thickness may be maintained constant at around 3-3.5 mm, with even very tight radii, which provides for reducing the weight of the tank (to about 3 Kg), a better appearance, eliminating scrap and dispensing with the welds on the pipes which are molded integral with the tank.

A further advantage of producing the tank in two halves subsequently sealed together is that it enables the formation of internal ribs and walls which serve both as strengtheners and for preventing fuel slosh inside the tank. Furthermore, the hook-on connection between respective portions 21 and 24 inside the two shells reduces locking strain on tank 1 along peripheral connecting portion 5 by functioning also as an internal support in the areas between portions 21 and 24 between the said shells 3 and 4. Lastly, tank 1 may be fitted inside with explosionproof sponges of known type, or with a fuel intake pump.

To those skilled in the art it will be clear that changes may be made to the fuel tank as described herein without, however, departing from the scope of the present invention.

CLAIMS

1. A plastic fuel tank for vehicles, characterised by the fact that it comprises at least two injection molded half shells secured together in sealed manner along a connecting portion.

2. A tank as claimed in Claim 1, characterised by the fact that it comprises an outer strip molded onto the said connecting portion for securing the said half shells together in sealed manner.

3. A tank as claimed in Claim 2, characterised by the fact that the said half shells present respective overlapping outer edges onto which the said strip is molded.

4. A tank as claimed in Claim 2 or 3, characterised by the fact that, in the said portion connecting the said half shells, openings are formed enabling the passage of portions of the said strip.

5. A tank as claimed in one of the foregoing Claims from 2 to 4, characterised by the fact that the said strip is formed from plastic material.

6. A tank as claimed in one of the foregoing Claims, characterised by the fact that a seal is inserted between the said portions connecting the said half shells.

7. A tank as claimed in one of the foregoing Claims, characterised by the fact that openings and/or external pipes are molded directly and integral with the said half shells.

8. A tank as claimed in one of the foregoing Claims, characterised by the fact that the said half shells present internal strengthening ribs and/or antislosh walls.

9. A tank as claimed in Claim 8, characterised by the fact that the said walls form a labyrinth zone for an inner compartment designed to receive a fuel level detecting unit and/or an electric intake pump.

10. A tank as claimed in one of the foregoing Claims, characterised by the fact that the said half shells present internal portions designed to hook together when the said half shells are joined.

11. A tank as claimed in one of the foregoing Claims, characterised by the fact that the said half shells constitute the top and bottom portions respectively of the said tank.

12. A tank as claimed in one of the foregoing Claims, characterised by the fact that the said half shells present built-in internal strengthening elements.

13. A tank as claimed in one of the foregoing Claims, characterised by the fact that the said half shells are formed from nylon.

14. A plastic fuel tank for vehicles, substantially as described and illustrated herein with reference to the accompanying drawings.

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